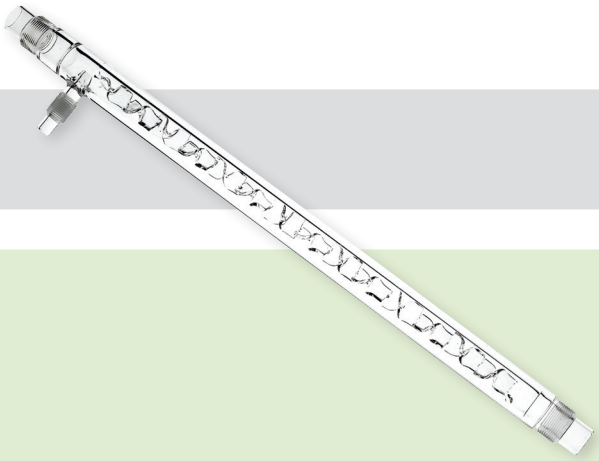
Static Mixer

A Contractor For Dissolving Ozone Gas In Fluids

The Static Mixer efficiently dissolves various gases under pressure. Both gas and fluid are injected into the Static Mixer while a series of baffles converts kinetic energy into turbulence, resulting in improved mixing and solution. The standard static mixer supports ultrapure water or sulphuric acid fluids while the PFA/PTFE versions support other chemistries including water containing hydrofluoric acid. Common applications include the solution of ozone gas in fluids for photoresist strip or for cleaning steps in semiconductor wet wafer processing.



Product Features

- High efficiency mass transfer for maximum dissolved ozone
- Quartz and PFA/PTFE versions available to accommodate multiple chemistries
- Flaretek or Pillar compatible fittings available (Pillar only for PFA/PTFE version)
- No consumable parts

Key Benefits

- Contamination free mixing
- Small size for easy installation
- Reliable design provides lower total cost of ownership

Description

Performance

The following diagrams show two application examples. Through a single pass, 30mg/l can be reached. Steady state concentrations are achieved quickly in recirculation mode.

- Mixing of ozone in UPW (single pass)
- Mixing of ozone in hot sulfuric acid (recirculation)

Example of Setup

The mass transfer of ozone gas in the fluid correlates with the product of the fluid flow rate and the pressure loss over the Static Mixer.

Not all ozone can be dissolved within the fluid. If gas bubbles are undesirable in the bath, a de-bubbler (a vessel with a low flow velocity) should be installed behind the Static Mixer. The gas outlet of the de-bubbler contains ozone, which has to be destroyed properly before exhausting into the environment.

For practical reasons, the gas inlet of the Static Mixer should be pointing upwards to avoid fluid residues in the gas line.

The Static Mixer can be installed within the recirculation loop. It must then be installed downstream of the pump (to minimize possible cavitation problems).

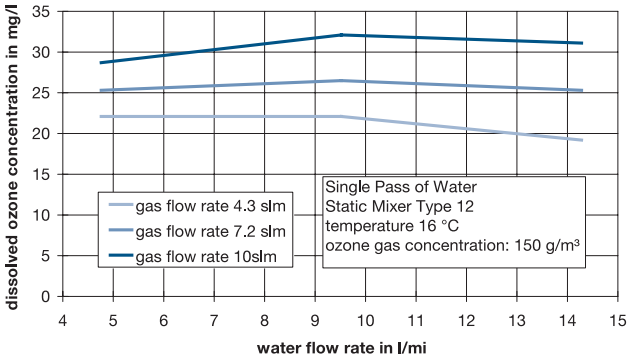


Figure 1 —
Application of ozone in cold water, single pass

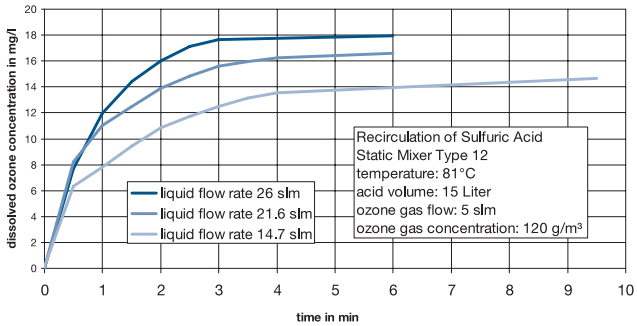


Figure 2 —
Application of ozone gas in hot sulfuric acid, recirculation

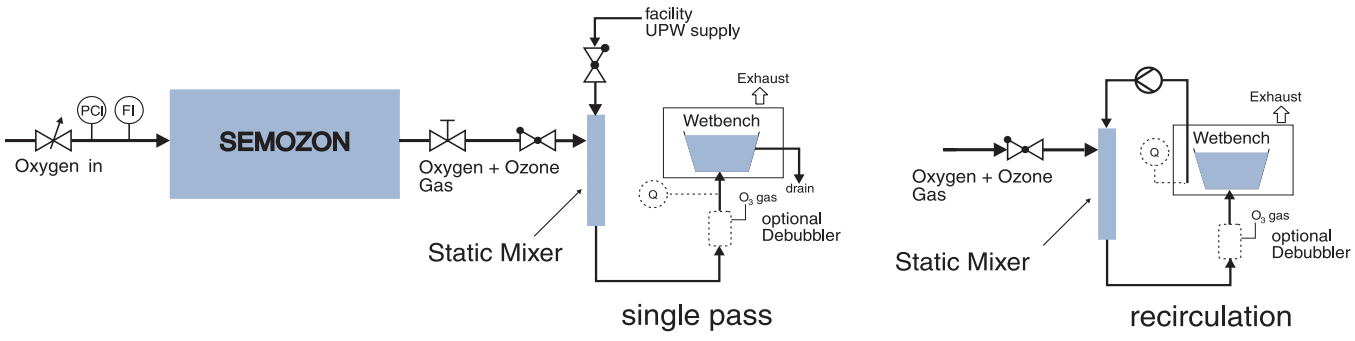
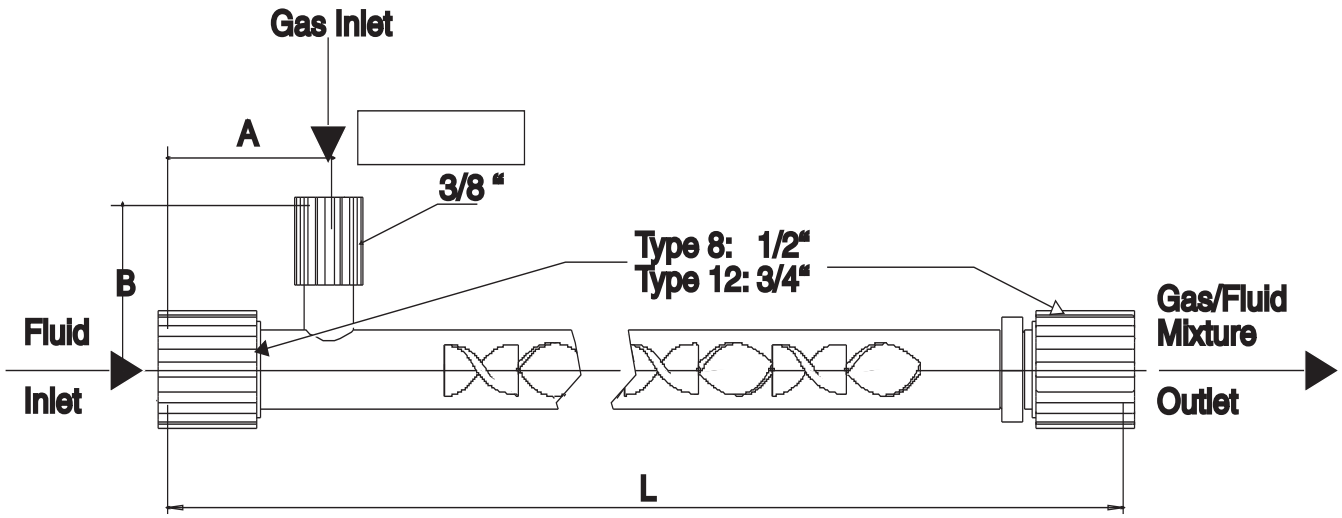


Figure 3 —
Two typical installation examples with a SEMOZON® ozone generator supplying a bath in a semiconductor wet bench

Specifications

Static Mixer	Type 8	Type 12
Fluid Flow Range	• 5 – 12 l/min recommended	• 10 – 25 l/min recommended
Gas Flow Range	Between 30% and 100% of the fluid flow (slm per l/min), 50% recommended	Between 30% and 100% of the fluid flow (slm per l/min), 50% recommended
Max. Operation Pressure	• 3.2 bar_{gauge} (46 psi_{gauge}) at 24°C (75°F) • 1.5 bar_{gauge} (22 psi_{gauge}) at 130°C (266°F), PFA • 1.0 bar_{gauge} (15 psi_{gauge}) at 130°C (266°F), Quartz	• 3.2 bar_{gauge} (46 psi_{gauge}) at 24°C (75°F) • 1.5 bar_{gauge} (22 psi_{gauge}) at 130°C (266°F), PFA • 1.0 bar_{gauge} (15 psi_{gauge}) at 130°C (266°F), Quartz
Fittings **Fluid Phase**	Flaretek compatible 1/2''	• Flaretek compatible 3/4'' • Pillar 3/4'' for PFA version available
Gas Phase	Flaretek compatible 3/8''	• Flaretek compatible 3/8'' • Pillar 3/8'' for PFA version available
Dimensions **Outer Diameter**	∅ 20 mm	∅ 27 mm
Weight	185 g (Quartz version)	• 385 g (Quartz version) • 325 g (PFA version)

Dimensional Drawing



Unless otherwise specified, dimensions are nominal values in inches referenced.

Static Mixer	Material	Fittings Type	Dimensions L	Dimensions A	Dimensions B
8 Quartz	Quartz	Flaretek compatible	339mm	67mm	50mm
12 Quartz	Quartz	Flaretek compatible	470mm	67mm	50mm
12 PFA Pillar	PFA/PTFE	Pillar	460mm	43mm	62mm

Ordering Information

Please contact your local MKS sales office for price and availability information.

www.MKSINST.com